Canadian Aviation Safety Board

Bureau canadien de la sécurité aérienne

Civil Aviation Occurrence Report

Canada

The Canadian Aviation Safety Board investigated this occurrence for the purpose of advancing aviation safety. It is not the object of the Board to determine or apportion any blame or liability.

AVIATION OCCURRENCE REPORT

AEROFLOT
ILYUSHIN IL 86 86074
GANDER, NEWFOUNDLAND
19 MARCH 1987

REPORT NUMBER 87-A74917

SYNOPSIS

After completing an instrument approach and landing in instrument meteorological conditions to runway 13 at Gander, Newfoundland, the aircraft ran off the right-hand side of the runway. The aircraft tracked through the snow for 1,444 feet (440 metres) before it returned to the runway. During this excursion, the aircraft sustained minor damage to the lower engine cowlings on the numbers one and four engines.

The Canadian Aviation Safety Board (CASB) determined that, while attempting to land from an unstabilized approach, the pilot brought the aircraft below the altitude prescribed by the standards of the USSR Civil Aviation Ministry for the performance of the missed approach manoeuvre. The pilot was unable to maintain the aircraft on the runway centre line because of the lack of adequate visual references when dense fog was encountered during the landing flare.

Ce rapport est également disporible en français.

13 September 1988

TABLE OF CONTENTS

		Page
1.0	**FACTUAL INFORMATION**	**1**
1.1	History of the Flight	1
1.2	Injuries to Persons	2
1.3	Damage to Aircraft	2
1.4	Other Damage	2
1.5	Personnel Information	3
1.6	Aircraft Information	3
1.7	Meteorological Information	3
1.7.1	Forecast Weather	3
1.7.2	Actual Weather	4
1.7.3	Weather Reported to Crew by Air Traffic Control	4
1.8	Aids to Navigation	5
1.9	Communications	5
1.10	Aerodrome Information	6
1.10.1	General	6
1.10.2	Runway 13	6
1.10.3	Runway Inspections	6
1.11	Flight Recorders	6
1.11.1	FDR Data Recovery	7
1.11.2	Analysis of the Recovered Data	7
1.12	Wreckage and Impact Information	7
1.13	Medical Information	8
1.14	Fire	8
1.15	Survival Aspects	8
1.16	Tests and Research	8
1.17	Additional Information	8
1.17.1	IL 86 Aircraft Dimensions	8
1.17.2	Snow-Clearance Criteria	8
1.17.3	Excursion - Side of Runway	9
1.17.4	Aeroflot Instrument Approach Procedure	10
1.17.5	IL 86 Aircraft Go-Around Capability	10
1.17.6	IL 86 Coupled ILS/Autopilot Approach	10
2.0	**ANALYSIS**	**11**
2.1	Introduction	11
2.2	FDR Information	11
2.3	Weather	11
2.4	Visual Effects on Landing	12
2.5	Flare and Landing	12
2.6	Snow Clearing	12
2.7	Decision to Land	12

TABLE OF CONTENTS

3.0	**CONCLUSIONS**	13
3.1	Findings	13
3.2	Causes	14
4.0	**SAFETY ACTION**	15
4.1.2	Snow-Removal Guidelines	15

5.0 APPENDICES

APPENDIX A PLAN/ELEVATION - INCIDENT AREA
APPENDIX B SNOW CLEARANCE COMPARED WITH TRANSPORT CANADA AND ICAO GUIDELINES
APPENDIX C GLOSSARY

1.0 FACTUAL INFORMATION

1.1 History of the Flight

On 19 March 1987, Aeroflot Flight 345B, an Ilyushin (IL)* 86, 86074, departed Moscow, U.S.S.R. on a ferry flight to pick up passengers stranded from Aeroflot Flight 346, at Gander, Newfoundland, Canada. After a planned refuelling stop at Shannon, Ireland, the flight continued to Gander. On board were six crew members. The pilot, who was at the controls in the left seat at the time of the incident, was not the aircraft captain. He was a company check-pilot who had been given the opportunity to fly the ferry flight from Moscow to Gander. He was to have completed a flight crew check on the aircraft crew during their return flight to Moscow.

Approaching Gander, terminal radar control vectored the aircraft for a straight-in instrument landing system (ILS) approach to runway 13, in instrument meteorological conditions (IMC). The co-pilot in the right seat was manually flying the approach when the aircraft intercepted the ILS localizer and glide path. The aircraft was initially established on the glide path but was deviating right and left of the localizer. With the runway approach lights in sight, the pilot in the left seat took control at decision height (DH), 200 feet (60 metres)**, and elected to continue the approach and complete the landing by visual reference to the runway. As the aircraft passed DH, it was below the glide path in a right-wing-low attitude. Several large roll corrections were made prior to the aircraft crossing the threshold at 50 feet (15 metres), slightly left of the centre line of the runway. During the flare and touchdown, the aircraft entered thicker fog and the visibility decreased, making it difficult to see the runway environment. A correction to the right was made, and the aircraft touched down in a right-wing-low attitude, 36 feet (11 metres) to the right of the centre line. The right bank was quickly reduced, but the aircraft ran off the right side of the runway. The pilot, aware that the aircraft was moving to the right, applied left rudder and increased the power slightly on the number four engine, and the aircraft returned to the runway.

* See Glossary for all abbreviations and acronyms.
** Units are consistent with official manuals, documents, reports, and instructions used by or issued to the crew.

During the excursion from the runway, the right main landing gear tracked through the snow 43 feet (13 metres) to the right of the edge of the runway. The number four engine pod struck the ground or dragged through the snow at, or shortly after touchdown, and the number one engine pod scraped the runway while the aircraft was being returned to the runway. The right main landing gear damaged two runway edge lights (see Appendix A).

The crew, unaware that the aircraft had left the runway surface, did not realize that there was any damage, so they taxied to the terminal and shut down the engines. Company officials were not aware of a problem until the field foreman had completed his runway inspection and reported damaged runway lights and tire tracks in the snow at the edge of runway 13.

The incident occurred at 2321 Coordinated Universal Time (UTC)*, during the hours of darkness, at lat 48°56'N, long 54°34'W at an elevation of 496 feet above sea level (asl).

1.2 Injuries to Persons

	Crew	Passengers	Others	Total
Fatal	-	-	-	-
Serious	-	-	-	-
Minor/None	6	-	-	6
Total	6	-	-	6

1.3 Damage to Aircraft

The keel and aft end of the number four engine was scraped and dented when the engine struck the snow. A small air intake was crushed, and the keel was scraped on the number one engine when it struck the runway. There was no evidence of engine damage caused by snow ingestion.

1.4 Other Damage

Two runway edge lights located just beyond taxiway Delta on the right side of the runway were broken.

* All times are UTC unless otherwise stated.

1.5 Personnel Information

	Pilot-At-Controls	First Officer
Age	56	49
Pilot Licence	Airline Transport (U.S.S.R.)	Airline Transport (U.S.S.R.)
Medical Expiry Date	Valid	Valid
Total Flying Time	15,000 hr	9,500 hr
Total on Type	2,100 hr	900 hr
Total Last 90 Days	135 hr	135 hr
Total on Type Last 90 Days	135 hr	135 hr
Hours on Duty Prior to Occurrence	11 hr	11 hr
Hours off Duty Prior to Work Period	24 hr	24 hr

1.6 Aircraft Information

Manufacturer	Ilyushin
Type	IL 86
Year of Manufacture	1982
Serial Number	86074
Certificate of Airworthiness	Not Available
Total Airframe Time	Not Available
Engine Type (4)	Kuznetsov NK-86
Maximum Allowable Take-off Weight	208,000 kg
Recommended Fuel Type	Jet A-1

The aircraft weight and centre of gravity were within the prescribed limits.

1.7 Meteorological Information

1.7.1 Forecast Weather

A terminal forecast issued at 1030Z on 19 March 1987 for Gander for the period 1100Z 19 March to 1100Z 20 March was as follows:

Ceiling 200 feet obscured, 1/4 mile visibility in fog, occasional partially obscured, ceiling 500 feet overcast, one mile visibility in light rain showers and fog.

The forecast, as issued in ICAO format, was as follows:

Wind variable direction at five knots, 400 metres visibility in fog, sky obscured, ceiling 200 feet,

temporarily 1 600 metres visibility in rain showers and mist, cloud 8/8 stratus at 500 feet.

A terminal forecast issued at 1630Z on 19 March 1987 for Gander for the period 1700Z 19 March to 1700Z 20 March was as follows:

Ceiling 100 feet obscured, 1/4 mile visibility in light drizzle and fog, wind 090 degrees true at 10 gusting to 20 knots, variable ceiling 400 feet overcast, two miles visibility in light rain showers and fog, occasional six miles visibility in rain showers and fog.

The forecast, as issued in ICAO format, was as follows:

Wind 090 degrees true at 10 gusting to 20 knots, 400 metres visibility in drizzle and fog, sky obscured, ceiling 100 feet, intermittent 3 200 metres visibility in rain showers and mist, cloud 8/8 stratus at 400 feet, temporarily 9 000 metres visibility in showers and mist.

1.7.2 Actual Weather

2000/19 March - Indefinite ceiling 100 feet obscured, 1/8 mile visibility in light rain and fog, wind 110 degrees true at 15 knots, obscuring phenomena fog.

2100/19 March - Regular Special - Indefinite ceiling 100 feet obscured, 1/8 mile visibility in very light rain and fog, wind 100 degrees true at 12 knots, obscuring phenomena fog.

2200/19 March - Regular Special - Indefinite ceiling 100 feet obscured, 1/8 mile visibility in light rain showers and fog, wind 090 degrees true at 15 knots, obscuring phenomena fog.

2300/19 March - Indefinite ceiling 100 feet obscured, 1/8 mile visibility in light rain showers and fog, wind 090 degrees true at 12 knots, obscuring phenomena fog.

1.7.3 Weather Reported to Crew by Air Traffic Control

2303Z - 2300 Gander weather: indefinite ceiling 100 feet obscured, visibility 1/8 of a mile in light rain showers and fog, temperature three, dew point three, winds are 110 magnetic at 10 knots, the altimeter is 2994. The RVR reading for runway 13 with the lights on strength setting five is 1,200 feet.

2313Z - ... Dash 8 just landed at Gander three minutes ago. He reported that he got the runway light, the approach lights at 250 feet, and that he got visual with the runway at the decision height on the approach, and also he reported some places on the approach where the visibility was greater than reported, and once he was on the ground, the visibility decreased. While he was taxiing up toward the ramp it got a little foggier.

2318Z - Wind 100 at 10 knots, altimeter 2993. You're cleared to land runway 13. Prevailing visibility is 1/8 of a mile in light rain showers and fog, runway 13 visual range is one thousand two hundred feet at runway light setting five.

2319Z - Wind 110 at 12 knots.

1.8 Aids to Navigation

The aircraft was conducting an ILS approach to runway 13 at Gander. All components of the ILS ground installation were reported to be functioning normally, and a flight check conducted by Transport Canada after the incident confirmed that the ILS was serviceable. The glide slope is set at three degrees, the threshold crossing altitude is 58 feet (18 metres) agl, and the touchdown point is 1,006 feet (307 metres) beyond the threshold.

The ILS approach limits for runway 13 are DH 200 feet (60 metres) agl, visibility one-half mile, and RVR 2,600 feet.

In this instance, the RVR was reported as 1,200 feet (366 metres); however, in accordance with accepted instrument flight rules (IFR) procedures, an approach can be continued as long as the RVR is reported to be at least 1,200 feet (366 metres) prior to the aircraft reaching the outer marker inbound.

1.9 Communications

Aeroflot Flight 345B, under control of Gander Terminal, descended to 2,700 feet and was radar-vectored for a straight-in ILS approach to runway 13. At 2316, control was handed over to Gander Tower on 118.1 megahertz (MHz). All communications were reported to be normal.

1.10 Aerodrome Information

1.10.1 General

Gander International Airport is at a reference altitude of 496 feet asl. Runway 13/31 is 8,900-by-200 feet and is one of two operational runways.

1.10.2 Runway 13

Runway 13 is an approved instrument runway with Category I centre-row high-intensity approach lighting and standard runway edge and threshold lighting. The runway is equipped with RVR measuring equipment in the touchdown area. All the approach and runway lighting was on and operating.

At the time of the occurrence, the airport was covered with snow. The runway was 100 per cent bare and wet, and the snow had been cleared back 25 feet (7.6 metres) from the edge of the runway. Snow, blown from the runway by snow-removal equipment, had piled up beyond the cleared area and was hard packed. The snow beyond the cleared area, where the aircraft landing gear tracked beside the runway, averaged 5.5 feet (1.7 metres) deep.

The terrain under the approach area and to the sides of the runway beyond the cleared area was snow covered and void of any remarkable features.

1.10.3 Runway Inspections

Asphalt surfaces at Gander are susceptible to deterioration because wheels of large aircraft track near the edges of the taxiways and because it is difficult to stabilize runway shoulders in severe weather conditions. Because of potential foreign object damage resulting from asphalt debris, Gander has established a policy of inspecting runways for debris after arrivals or departures of wide-body aircraft, in particular, the Boeing 747 and IL 86 aircraft. A runway inspection was carried out by the field foreman, after Flight 346 landed.

1.11 Flight Recorders

The aircraft was equipped with a MSRP-256 flight data recorder (FDR) system and a MARS-BM cockpit voice recorder (CVR).

1.11.1 FDR Data Recovery

The FDR and CVR were analysed by CASB investigators at the Aeroflot Playack Facility at Sheremetyevo Airport, Moscow in cooperation with Aeroflot and the U.S.S.R. State Science and Research Institute for Civil Aviation. A segment of the final approach from the outer marker to the landing and roll-out was examined in detail.

1.11.2 Analysis of the Recovered Data

The data indicated that the aircraft was stabilized on the glide path and localizer when it passed the outer marker. The glide path was maintained, but the aircraft deviated about the localizer with roll angles of four to five degrees over the next 70 seconds. The approach became unstable 11 seconds prior to passing DH, 200 feet (60 metres), and the aircraft moved to about 40 feet (12 metres) right of the localizer and descended slightly below the glide path. A 10-degree, left-wing-down correction was applied and then rapidly changed to six degrees right-wing-down as the aircraft crossed the threshold at 50 feet (15 metres) agl, 33 feet (10 metres) to the left of the centre line.

The aircraft touched down in a nine-degree right-wing-down attitude, 36 feet (11 metres) to the right of the centre line. The application of left rudder had aligned the aircraft with the runway at touchdown, but the aircraft was still drifting to the right. The right-wing-down attitude was rapidly decreased, and left bank was applied as the aircraft ran off the right edge of the runway. The aircraft tracked off the runway for seven seconds during which time 25 degrees of left rudder and differential thrust on the number four engine were applied to regain the centre line.

1.12 Wreckage and Impact Information

There was no report made of the incident to air traffic services; the crew stated that they were not aware that the aircraft had run off the runway. During the required runway inspection, the field foreman discovered the broken lights and the tracks through the snow to the right-hand edge of runway 13.

The aircraft ran off the runway surface 1,818 feet (544 metres) from the threshold, and the right main and centre main landing gear tracked through deep, packed snow for 918 feet (280 metres). The aircraft then ran across taxiway Delta and its cleared area and returned to

the runway surface 3,268 feet (994 metres) from the threshold.

1.13 Medical Information

- Nil -

1.14 Fire

There was no evidence found of fire either before or after the occurrence.

1.15 Survival Aspects

Touchdown forces were within the normal forces experienced on landing.

1.16 Tests and Research

Not applicable.

1.17 Additional Information

1.17.1 IL 86 Aircraft Dimensions

The IL 86 has a wingspan of 157 feet (48 metres). The left and right main landing gear are located 16 feet (5 metres) to either side of a centre line main gear. The numbers one and four engines are 57 feet (17.4 metres) from the centre line of the aircraft, while the numbers two and three engines are 33 feet (10.2 metres) from the centre line. The outboard engines have a ground clearance of 4 feet (1.2 metres), and the inboard engines have a ground clearance of 3 feet (.95 metres).

1.17.2 Snow-Clearance Criteria

Transport Canada Manual of Snow Removal and Ice Control outlines a priority system regrading snow removal at airports. Priority I areas include one runway depending on prevailing wind direction, one taxiway, and the terminal area. Priority II areas include another runway and associated taxiway. Priority III areas include all shoulder areas, pre-threshold areas, glide path sites, and any remaining runways, taxiways, or parking areas. Priority I and II areas are normally cleared throughout

a storm while Priority III areas are cleared last, in accordance with available manpower and equipment.

The Manual of Snow Removal provides guidelines for snow-removal procedures and indicates desired clearance distances and snow depths.

During Priority III snow-clearing operations, the snow beyond the runway edge lights is to be removed to a distance of at least 25 feet (7.6 metres) on both sides of all runways and taxiways to ensure that the lights remain uncovered if snow-drifting occurs. Vertical snow slopes are to be avoided along the edges of the runway, taxiways, aprons, and at the ends of the runways. Vertical edges must be rolled or levelled to form a smooth slope, as flat as possible, from the cleared areas to the snow-disposal area. In accordance with Appendix C of the manual, the maximum allowable snow depth 50 feet (15 metres) from the edge of the runway is 2.5 feet (1.3 metres). By ICAO recommended practices, the snow depth near the runway edge of the runway can be one foot (0.3 metres) increasing linearly to three feet (0.9 metres) 50 feet (15 metres) from the runway edge then to five feet (1.5 metres) at 66 feet (20 metres) from the edge. (See Appendix B.)

Although the required 25-foot (7.5 meters) area on both sides of runway 04 had been cleared, Priority III area clearing had not been completed because of the heavy snow accumulation in the days prior to the incident, which had kept snow-removal crews busy with Priority I and II areas.

1.17.3 Excursion - Side of Runway

There were two tracks observed in the snow beside runway 13. The closest track to the edge of the runway was measured at 26 feet (8 metres) and averaged 1 1/2 feet (.5 metres) in depth. The outer track measured 43 feet (13 metres) from the edge of the runway, and the depth of the track averaged 3 1/4 feet (1 metre). The measurement between the tracks corresponds to the distance between the centre and right main landing gear. The right wing tip of the aircraft was extended 104 feet (32 metres) over the snow beside the runway.

The number four engine pod scraped the ground within 25 feet (7.5 metres) of the runway edge at, or shortly after touchdown, when the aircraft was in a right-wing-low attitude. Because of the hard icy surface conditions, it could not be determined exactly where the engine struck the surface. The number one engine pod scraped the runway while the aircraft was in a

left-wing-low attitude, returning to the runway; however, it was not possible to determine where or when contact was made.

1.17.4 Aeroflot Instrument Approach Procedure

Aeroflot uses a pilot-monitored approach while flying instrument approaches. The co-pilot flies the approach to DH. If the captain, or pilot in the left seat, has the runway environment in sight at DH, he takes over control and lands visually. If he has not made visual contact, he gives the co-pilot the command to go around.

1.17.5 IL 86 Aircraft Go-Around Capability

The IL 86 is capable of a go-around from below DH. It is normal Aeroflot practice to not conduct go arounds from below 50 feet (15 metres); however, the aircraft is capable of a go-around from any altitude, and touch-and-go landings are conducted during training.

1.17.6 IL 86 Coupled ILS/Autopilot Approach

The IL 86 is equipped for and capable of performing a coupled ILS/autopilot approach. The aircraft was hand-flown by preference of the crew involved. The aircraft ILS equipment and autopilot were reported to be functioning normally.

2.0 ANALYSIS

2.1 Introduction

Following the occurrence, the crew stated that they were not aware that the aircraft had left the runway surface, or that the aircraft or runway edge lights had been damaged. However, the measurement of the marks in the snow beside the runway and the data from the FDR confirmed that the aircraft had departed the runway surface during the landing.

The analysis focuses on the reasons why the aircraft departed the runway surface during the landing.

2.2 FDR Information

The FDR information indicated that the hand-flown ILS approach was not completely stabilized when the aircraft reached DH. At DH, when the pilot in the left seat took control, the aircraft was below the glide path and moving to the right of the localizer. In spite of several rapid corrections in an attempt to align the aircraft with the centre line, the aircraft was 33 feet (10 metres) to the left of the centre line when it crossed the threshold 50 feet (15 metres) agl. Right bank was applied, and the aircraft touched down in a right-wing-low attitude, 36 feet (11 metres) to the right of the centre line. The right-wing-down attitude and the excursion off the runway were the result of inputs by the pilot while he was flaring the aircraft and attempting to maintain the centre line.

2.3 Weather

The observed weather at the time of the incident indicated that the weather was below limits for runway 13; however, because the RVR was 1,200 feet or greater, the approach could be conducted. The flight was also advised that the crew of an aircraft that had landed 13 minutes earlier indicated that the conditions on final approach were better than the reported observations.

The conditions as reported and observed by the crew indicated that the approach and landing could be conducted safely. This conclusion is supported by the crew's report that the approach and runway edge lights were in sight at DH. In spite of conditions at DH, as the

aircraft was flared for landing, the fog became thicker, and the visibility decreased. Because of the movement of the fog over the ground, the visibility over the landing area, just at the time of the flare, could have been less than that recorded by the RVR equipment or as observed by other pilots. The pilot did not attempt a go-around because he considered that the conditions at DH would allow a safe landing.

2.4 Visual Effects on Landing

The poor visibility because of the rain and fog, the dark, wet runway, the featureless snow-covered terrain on approach and off the sides of the runway, and the effects of the landing lights shining through the rain and fog all contributed to the crew's inability to adequately see the landing area and maintain the aircraft on the runway centre line.

2.5 Flare and Landing

The pilot took control at DH and elected to complete the landing because he had the runway environment in sight. Because of the rain and fog, the pilot had limited visual cues as he attempted to correct to the centre line. During the flare and landing, the visibility decreased unexpectedly because of the thicker fog and deprived the pilot of essential visual landing cues. The pilot, aware that the aircraft was moving to the right, applied corrective action; however, because visual landing references were obscured by the fog, he was unable to prevent the aircraft from leaving the runway surface.

2.6 Snow Clearing

It could not be determined exactly when the number four engine struck the surface; however, because there was very little snow in the area where the strike occurred, snow depth was not instrumental in causing the strike.

2.7 Decision to Land

As the aircraft passed DH, the pilot could see the runway environment and decided that he could land safely. When he lost visual references in the flare, the aircraft was in a position where, in accordance with Aeroflot practice, a go-around should not be attempted.

3.0 CONCLUSIONS

3.1 Findings

1. The landing was completed in weather conditions which restricted visual landing references.

2. The approach was not stabilized when the pilot in the left seat took control at decision height.

3. As the pilot was attempting to correct to the centre line, the aircraft entered an area of more dense fog, and the pilot lost adequate visual contact with the runway environment.

4. Because the aircraft was in the landing flare, the pilot, in accordance with Aeroflot practice, considered himself committed to land.

5. The aircraft landed in a right-wing-low attitude, resulting in the number four engine pod sustaining minor damage when it scraped the snow-covered ground as the aircraft ran off the side of the runway.

6. The number one engine pod sustained minor damage when it scraped the runway as the aircraft came back onto the runway surface.

7. The snow depth where the landing gear travelled through the snow was up to 5.5 feet (1.7 metres). The snow depth, according to Transport Canada guidelines, should not have exceeded 2.5 feet (0.8 metres). However, Priority III area snow removal had not been completed because of the heavy snow accumulation in the days prior to the incident.

8. The aircraft crew was not aware that Priority III area snow removal had not been completed to Transport Canada guidelines.

9. The flight crew was certified and qualified for the flight.

10. The aircraft weight and centre of gravity were within the prescribed limits.

11. There was no evidence found of any airframe or system malfunction prior to or during the flight.

3.2 Causes

While attempting to land from an unstabilized approach, the pilot brought the aircraft below the altitude prescribed by the standards of the USSR Civil Aviation Ministry for the performance of the missed approach manoeuvre. The pilot was unable to maintain the aircraft on the runway centre line because of the lack of adequate visual references when dense fog was encountered during the landing flare.

4.0 SAFETY ACTION

4.1 The Canadian Aviation Safety Board (CASB) notes the following action taken by USSR Civil Aviation Authorities as a consequence of this occurrence:

a. The circumstances and causes of this occurrence have been the subject of a promotional campaign to both flight and air traffic control personnel;

b. Steps have been taken to exclude the possibility of aircrew "ducking under" the prescribed glide path while conducting an approach in adverse weather conditions; and

c. Flight crews are now permitted to initiate a go-around, if required, from any flight altitude during the final stages of the approach.

4.1.2 Snow-Removal Guidelines

The CASB forwarded an Aviation Safety Advisory to the Department of Transport, addressing the snow-removal guidelines for airports across Canada. The CASB suggested that Transport Canada review the current snow-clearing guidelines for relevancy, ease of understanding, and consistency of application. Transport Canada has indicated that:

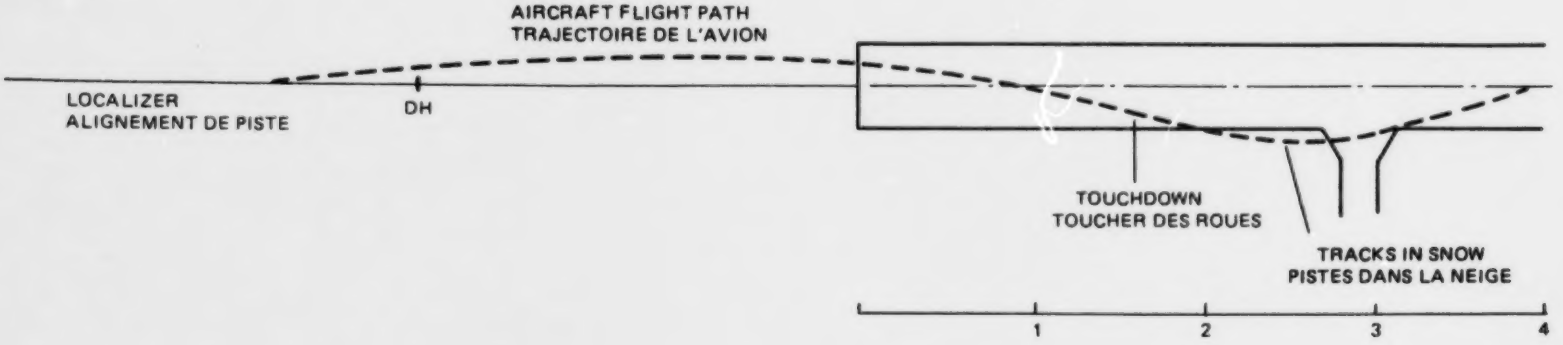
a. A review of the current snow-clearing practices will be conducted by officials of the Airport Authority Group; and

b. Transport Canada will ensure that there is no misunderstanding on the part of airport supervisors in regard to the snow-removal guidelines.

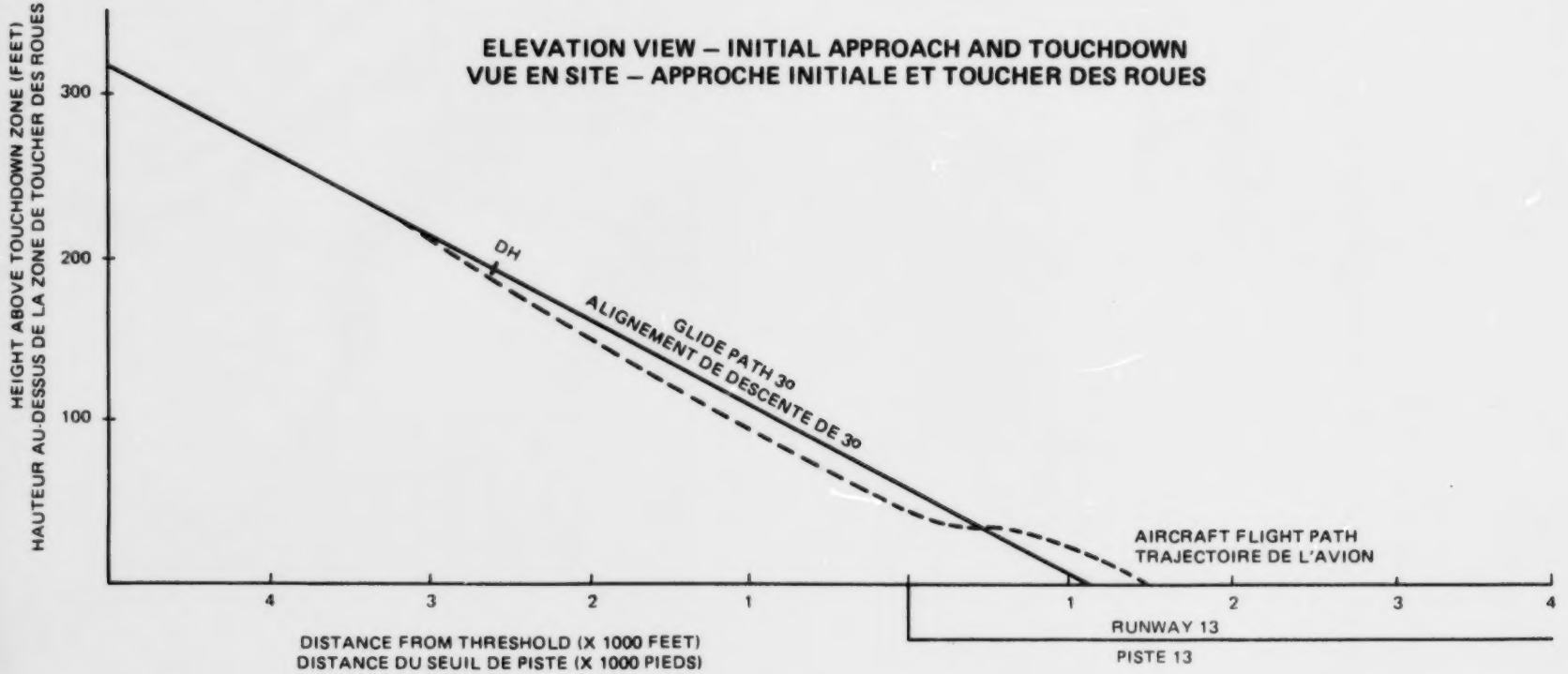
This report and the safety action therein has been adopted by the Chairman, K.J. Thorneycroft, and Board Members:

N. Bobbitt
L. Filotas
W. MacEachern
D. Mussallem
A. Portelance
R. Stevenson
F. Thurston

PLAN VIEW – INITIAL APPROACH AND LANDING ROLL
VUE EN PLAN – APPROCHE INITIALE ET COURSE À L'ATTERRISSAGE



ELEVATION VIEW – INITIAL APPROACH AND TOUCHDOWN
VUE EN SITE – APPROCHE INITIALE ET TOUCHER DES ROUES



NOT TO SCALE
NON À L'ÉCHELLE

APPENDIX A
TO 87-A74917
ANNEXE A
A 87-A74917

SNOW PROFILE
DÉNEIGEMENT

A – TRANSPORT CANADA GUIDELINE
LIGNES DIRECTRICES DE TRANSPORTS CANADA

B – ACTUAL SNOW DEPTH (POINT OF MAXIMUM DEPARTURE)
ÉPAISSEUR RÉELLE DE LA NEIGE (POINT LE PLUS ÉLOIGNÉ SUR LA PISTE)

C – ICAO GUIDELINE
PRATIQUES RECOMMANDÉES DE L'OACI

FEET PIEDS	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70
METRES MÈTRES			3.05		6.10		9.15		12.2		15.2		18.3		21.3

DISTANCE FROM EDGE OF RUNWAY
DISTANCE DU BORD DE PISTE

APPENDIX B
TO 87-A74917
ANNEXE B
A 87-A74917

GLOSSARY

agl	above ground level
asl	above sea level
CASB	Canadian Aviation Safety Board
CVR	cockpit voice recorder
DH	decision height
FDR	flight data recorder
hr	hour(s)
IFR	instrument flight rules
IL	Ilyushin
ILS	instrument landing system
IMC	instrument meteorological conditions
kg	kilogram(s)
lat	latitude
long	longitude
MHz	megahertz
N	north
RVR	runway visual range
UTC	Coordinated Universal Time
W	west
°	degree(s)
'	minute(s)